

## **APPENDIX B**

LCG Department of Traffic and Transportation  
MPO Comprehensive Plans:

- Evangeline Thruway Internal and External Traffic Study
- Interstate 49 Lafayette RR-4, Eastern Bypass,  
and Eastern Alignment Traffic Scenarios

## 0.0 Executive Summary

Using these three traffic modeling scenarios for trips along the Evangeline Thruway, we can summarize the analysis in the table below:

<b>TABLE 0.0</b>				
<b>LAFAYETTE CONSOLIDATED GOVERNMENT NUMBER AND PERCENTAGE OF MODEL TRIPS UTILIZING EVANGELINE THRUWAY INTERNAL AND EXTERNAL TRIPS FOR LAFAYETTE PARISH</b>				
Measurement	Model Trips			Total
	Internal- Internal	Internal-External External-Internal	External- External	
Average Number of Trips	26,520	19,880	4,690	51,090
Percentage of Total Trips	52%	39%	9%	100%

We will first explain our methodology and then explain our results in terms of specific percentages, and measures of the relationships.

## 1.0 Network

The network that we are using is the 2000 year network which has all of the transportation network streets existing in the year 2000 for Lafayette Parish. The reason we are using the 2000 year network is that it matches our 2000 census demographic data. The network is balanced in that it has a linear correlation coefficient of  $+0.96^1$  of between existing and modeled traffic patterns with the parish. This level of accuracy is above the standard used by the Federal Highway Administration of  $+0.88$ .<sup>2</sup> The network is the result our staff's work and represents many hundred of hours of data collection, verification and data checking as well as analysis over a three year period.

<sup>1</sup> Technically, this value is the result of a regression analysis in which the linear correlation coefficient is  $+0.96$ , and a 95% level of confidence. A perfect (concomitant) relationship between two numbers which co-vary would be a linear correlation coefficient of  $+1.0$ . No relationship would be a linear correlation coefficient of  $0.0$ . An inverse (negative) relationship in which a high number varies with a low number would be a linear correlation coefficient of  $-1.0$ . A correlation of coefficient of  $+0.92$  shows a strong relationship between two variables. The level of confidence means that if we took 100 samples of data, then 95 samples would have valid results; only 5 samples would be subject to error. A 95% level of confidence is typically used a standard to predict human behavior in the social sciences.

<sup>2</sup> Federal Highway Administration, Calibration and Adjustment of System Planning Models (Publication No. FHWA-ED-90-015) (No publication place given: December 1990), p. 35.

## 2.0 Demographics

We are using the 2000 year demographics (except for employment). The model utilizes the 2000 census figures plus locally collected 2000 year demographics (such as school attendance) to predict the number of trips produced for each of the 310 internal traffic zones and 35 external traffic zones. Except for employment figures, these demographics are the result of our staff's work. The employment figures are an estimate using the 1990 employment figures projected for the year 2000. These employment estimates were made in 1995 by a consultant, Neel-Schaffer Inc., while on contract with DOTD. We in the process of doing a parish wide employment survey at the present. Once we are completed, these demographic figures will represent a significant investment of our staff time's to collection and verify this data set.

## 3.0 Assumptions

Using the demographics, we use a series of equations that predict the number of trips that will leave each zone and then end at each other zone in the parish. The network files uses formulas to calculate the shortest travel time based on the size and capacity of the network as well as the number of trips utilizing each segment of the transportation network. We have checked the results of our base year network and demographics to the traffic counting stations.

## 4.0 Traffic Counting Data

We have collected and then interpolated the DOTD traffic figures from 1985 to 2000. These are actual counts of vehicles which were then seasonally adjusted for an annual period. These numbers are issued about every 2 to 3 years. During the years without a count, we interpolated the values. These figures are the number of vehicles per day that pass at a certain point. We do not know the origin or destination of these trips. We have about 110 DOTD counting stations in the parish of which there are 8 stations along Evangeline Thruway. This data is the standard that we measure the accuracy of our modeling efforts.

## 5.0 Verification

Once we ran the scenarios which assigned traffic to the roadway network, we checked the results against the counting station data. This is a procedure to determine if our assumptions embedded in the design of the scenario led to traffic patterns that were not patterns typically found in the network. In fact, this is often the case as when an improvement is added and alters traffic flow dramatically, but in this case we sought to model existing traffic patterns without creating new patterns. We were not modeling new roadways, but rather types of trips.

We compared the counting station data along the Thruway and found that the modeled results matched the counting station data with a linear correlation coefficient of +0.92. As such, we exceed

the FHWA modeling standards of +0.88.<sup>3</sup> We also asked ourselves a further question: what chance is the correlation subject to chance? Perhaps the strength of the relationship might be low for the sample size. We performed a Fisher Z transformation test that either predicts a significant relationship not due to chance or a non-significant relationship in which chance may explain the figures. In this case, we found that the relationship is significant.

## 6.0 Question and Answers

The basic research question is "What is the percentage of trips on the Evangeline Thruway?".

The Evangeline Thruway is defined as US Highway 90 from the parish line at St. Martin Parish near Le Triomphe subdivision and continuing to the Interstate 10 and Interstate 49 cloverleaf.

In order to answer our research question, we modeled three traffic scenarios on the Evangeline Thruway. Scenario 1 modeled all trips that begin and end in Lafayette. These trips are referred to as Internal-Internal trips because their origin and destination are both internal to the parish. In Scenario 2, we modeled the remainder of trips (not included in Scenario 1). These trips in Scenario 2 are all trips with an external component. There were three kinds of trips in Scenario 2: (A) trips whose origin and destination are outside the parish (external-external trips); (B) trips whose origin was inside the parish, but whose destination was outside of the parish (internal-external trips); (C) and trips whose origin was outside the parish, but whose destination was inside of the parish (external-internal trips). These three trips types were summed into one total. We next modeled Scenario 3 which was only those trips whose origin and destination was outside of the parish (external-external trips).

We thus have three sets of figures based on the Scenario which generated the traffic prediction:

Scenario 1: Internal to Internal Trips

Scenario 2: External to External Trips, Internal to External Trips, and External to Internal Trips

Scenario 3: External to External Trips

We can then provide the following formulas, actual values and percentages as modeled on the Evangeline Thruway by type:

Formula 1:

Scenario 1	+	Scenario 2	=	All Trips
26,520	+	24,570	=	51,090
52%	+	48%	=	100 %

Formula 2:

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<sup>3</sup> See Footnote one for the technical meaning of this value and the level of confidence that was used to generate this figure. See footnote 3 for the citation of modeling standards.

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Scenario 2	-	Scenario 3	=	Internal to External and External to Internal Trips
24,570	-	4,690	=	19,880
48%	-	9%	=	39%

The number of external-external trips (Scenario 3) at first glance was relatively low being 9%. We cross checked the last available survey <sup>4</sup> of drivers as performed jointly by Sellers, Dubroc and Associates, a local Lafayette Louisiana civil engineering consultant, and Wilbur Smith Associates, an international traffic modeling consultant. The consultants surveyed drivers during the Spring of 1991 at certain external station in Lafayette Parish. One station where drivers were surveyed was US 90 South with a traffic count of 20,343 of which 15.9 percent were external-external trips. Thus, the total external-external trips at this point was 3,235 trips. We also queried with L.P. Ledet, a consultant with Neel-Schaffer Inc., who is planning to conduct the next external-external driver survey for Lafayette Parish in the next 18 months. Mr. Ledet cited a similar figure of 15% as a typical number of external-external trips in urban areas (like Lafayette) with populations of 100,000 to 250,000. <sup>5</sup> We searched our planning library and found a second reference to a 15% standard for cities with a population of 100,000 to 250,000. <sup>6</sup> Furthermore, the current DOTD average daily traffic (ADT) of the traffic entering Lafayette Parish on US Hwy 90 near the St. Martin Parish Line is 24,822 of which 15.9% would be 3,947 trips entering the parish as external-external trips. Thus, we have several estimates, all of which mutually supports estimates as ranging from about 3,000 to 5,000 external-external trips.

Thus, a modeling estimate of external to external trips using the Thruway of 4,690 is a figure which is valid and reasonable.

## 8.0 More Information

This is a summary of a complex set of calculations and graphic map files. If more data is required, please make a specific request so that we may query our data. Draft 1.0 (November 19, 2002) of this report was circulated for comments and a request was received to provide the number of external to external trips (Scenario 3) as a separate total. After completing these computations, portions of the report were rewritten to incorporate these totals into the existing computations and commentary.

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<sup>4</sup> Wilbur Smith Associates and Sellers, Dubroc and Associates, Technical Memorandum No. 3, Transportation Model Development and Calibration, Lafayette Transportation Plan (Lafayette, Louisiana, April 1991), Table 5, Page 10.

<sup>5</sup> Arthur B. Sossau et al, Quick Response Urban Travel Estimation Techniques and Transferable Parameters, (Washington, DC 1978) National Cooperative Highway Research Program Report 187.

<sup>6</sup> Federal Highway Administration, Calibration and Adjustment of System Planning Models (Publication No. FHWA-ED-90-015) (No publication place given: December 1990), p. 31